

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-17 (Cancelled)

18. (Currently Amended) A process for fractionating a crude C₄ fraction comprising butanes, butenes, 1,3-butadiene and small amounts of other hydrocarbons including C₄-acetylenes, 1,2-butadiene and C₅-hydrocarbons by extractive distillation using a selective solvent, the process comprising

feeding the crude C₄ fraction into a middle region of a first extractive distillation column and feeding the selective solvent into the column at a point above where the crude C₄ fraction is fed

taking off a gaseous side stream from the first extractive distillation column at a point below the feed point for the crude C₄ fraction, wherein the gaseous side stream comprises the C₄-acetylenes, 1,3-butadiene, 1,2-butadiene, C₅-hydrocarbons and selective solvent; and wherein the concentration of the C₄-acetylenes in the gaseous side stream is below a spontaneous decomposition limit; and

taking off an overhead stream comprising components of the crude C₄ fraction which are less soluble than the C₄-acetylenes in the selective solvent from the top of the first extractive distillation column;

feeding the gaseous side stream to a first side column in which the gaseous side stream is separated into an overhead stream and a bottom stream,

wherein the overhead stream comprises the C₄-acetylenes and is condensed in a condenser at the top of the first side column;

a part of the condensed overhead stream is returned as runback to the first side column, and

returning the bottom stream which comprises the selective solvent to the first extractive distillation column.

19. (Cancelled).

20. (Currently Amended) The process as claimed in claim 18, further comprising A process for fractionating a crude C₄ fraction comprising butanes, butenes, 1,3-butadiene and small amounts of other hydrocarbons including C₄-acetylenes, 1,2-butadiene and C₅-hydrocarbons by extractive distillation using a selective solvent, the process comprising feeding the crude C₄ fraction into a middle region of a first extractive distillation column and feeding the selective solvent into the column at a point above where the crude C₄ fraction is fed

taking off a gaseous side stream from the first extractive distillation column at a point below the feed point for the crude C₄ fraction, wherein the gaseous side stream comprises the C₄-acetylenes, 1,3-butadiene, 1,2-butadiene, C₅-hydrocarbons and selective solvent; and wherein the concentration of the C₄-acetylenes in the gaseous side stream is below a spontaneous decomposition limit; and

taking off an overhead stream comprising components of the crude C₄ fraction which are less soluble than the C₄-acetylenes in the selective solvent from the top of the first extractive distillation column;

taking off a bottom stream from the first extractive distillation column, cooling the bottom stream by indirect heat exchange with the crude C₄ fraction, condensing the bottom stream in a condenser; and returning the condensed bottom stream to the first extractive distillation column;

taking off a liquid or a substream of the liquid from the first extractive distillation column at a theoretical plate, which is one or more theoretical plates below the point at which the gaseous side stream is taken off,

heating and/or vaporizing the liquid by indirect heat exchange with the bottom stream from the first extractive distillation column; and

returning the heated and/or vaporized liquid to the first extractive distillation column at the same theoretical plate or above, wherein the theoretical plate from which the liquid or liquid substream is taken off being chosen so that the energy requirement for the first extractive distillation column is minimized.

21. (Cancelled)

22. (Previously Presented) The process as claimed in claim 18, further comprising condensing the overhead stream from the first extractive distillation column in a condenser at the top of the first extractive distillation column, and wherein part of the condensed overhead stream is returned as runback to the first extractive distillation column while the remainder of the condensed overhead stream is fed to a second extractive distillation column in which the remainder of the condensed overhead stream is separated into raffinate 1 and crude 1,3-butadiene.

23. (Previously Presented) The process as claimed in claim 22, further comprising partially condensing the overhead stream in the condenser at the top of the first extractive distillation column to yield a condensed portion and a gaseous portion; and

returning the condensed portion of the overhead stream from the first extractive distillation column as runback to the first extractive distillation column and feeding the gaseous portion of overhead stream to the second extractive distillation column.

24. (Previously Presented) The process as claimed in claim 22, further comprising taking off an overhead stream from the second extractive distillation column; condensing the overhead stream in a condenser, wherein part of the condensed overhead stream is returned to the second extractive distillation column as runback while the remainder of the condensed overhead stream is taken off as raffinate 1,

taking off a side stream from the second extractive distillation column below the feed point for the condensed overhead stream from the first extractive distillation column.

25. (Previously Presented) The process as claimed in claim 24, further comprising feeding the side stream taken off from the second extractive distillation column is fed to a second side column;

separating that side stream into an overhead stream,
condensing the overhead stream,
returning a part of the condensed overhead stream as runback to the second side column,

taking off the remainder of the condensed overhead stream as a crude 1,3-butadiene stream; and

returning the remainder of the condensed overhead stream as a crude 1,3-butadiene stream and a bottom stream which comprises the selective solvent to the second extractive distillation column.

26. (Previously Presented) The process as claimed in claim 22, further comprising taking off a liquid or a substream of the liquid from the second extractive distillation column at a theoretical plate, which is one or more theoretical plates below the side stream offtake of the second extractive distillation column;

heating and/or vaporizing the liquid by indirect heat exchange with the bottom stream from the second extractive distillation column; and

returning the heated and/or vaporized liquid to the second extractive distillation column on the same theoretical plate or above, with the theoretical plate from which the liquid or liquid substream is taken off being chosen so that the energy requirement for the second extractive distillation column is minimized.